PRACTICAL-7

Aim:- Implement hello world using quantum computer

Unlike classical computers, quantum computers don’t have a simple "print" operation. Quantum computers work with **qubits**, **superposition**, and **quantum gates**.

Hello World in quantum computing typically means:

- Preparing a quantum circuit.
- Running a basic operation (like flipping a qubit).
- Measuring the output to get a classical result.
- Showing that the quantum program ran successfully.

The most basic "Hello World" quantum program involves:

- Initializing qubits.
- Applying a **Hadamard Gate** (creates superposition).
- Measuring the qubits.
- Printing the output.

We usually use **IBM's Qiskit** (Python library) to run this locally or on IBM's real quantum computers.

Steps:-

1. **Install Qiskit**
    - Install the Qiskit library using pip.
2. **Import Required Libraries**
    - Import QuantumCircuit, Aer, and execute modules.
3. **Create a Quantum Circuit**

- Initialize 1 or more qubits.
- Apply a Hadamard gate to create superposition.

4. **Add Measurement**
   - Measure the qubits and store the result.
5. **Simulate the Circuit**
   - Use a local simulator (Aer) to run the quantum circuit.
6. **Print the Results**
   - Display the result, which shows the probabilities of different outcomes (like "0" or "1").